

Minnesota Academic Standards: Interface with Big River Journey

Big River Teacher's Guide Classroom Activities	Grade Level	Strand	Sub-Strand	Standard	Benchmarks (ex.)
Water Cycle: Imagine!	4	SCIENCE III. EARTH AND SPACE SCIENCE	B. The Water Cycle, Weather and Climate	The student will recognize that water on Earth cycles and exists in many forms.	1. The student will describe the water cycle involving the processes of evaporation, condensation, precipitation and collection. 2. The student will identify where water exists on Earth.
Water Cycle: The Incredible Journey	4	SCIENCE III. EARTH AND SPACE SCIENCE	B. The Water Cycle, Weather and Climate	The student will recognize that water on Earth cycles and exists in many forms.	1. The student will describe the water cycle involving the processes of evaporation, condensation, precipitation and collection. 2. The student will identify where water exists on Earth.
	6	II. PHYSICAL SCIENCE	C. Energy Transformations	The student will understand that energy exists in many forms and can be transferred in many ways.	4. The student will understand the relationship between light and heat.
	5	LANGUAGE ARTS II. WRITING	B. Elements of Composition	The student will engage in a writing process, with attention to organization, focus, quality of ideas, audience and a purpose.	1. Write topic sentences. 2. Create multiple paragraph compositions. 3. Use composing processes.
Geology: Create Sedimentary Strata	5	SCIENCE III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will explore the structures and functions of Earth systems.	1. The student will recognize the natural processes that cause rocks to break down into smaller pieces and eventually into soil. 2. The student will investigate the formation, composition and properties of soil. 3. The student will describe how waves, wind, water and ice shape and reshape the Earth's surface.
	5	I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will understand the process of scientific investigations.	1. The student will perform a controlled experiment using a specific step-by-step procedure and present conclusions supported by evidence.
	6	I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will understand that scientific inquiry is used in systematic ways to investigate the natural world.	2. The student will distinguish between observation, prediction, and inference.

Geology: Make Your Own Fossil	5	SCIENCE III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will explore the structures and functions of Earth systems.	3. The student will describe how waves, wind, water and ice shape and reshape the Earth’s surface. 3. The student will recognize that organisms are growing, dying and decaying, and that their matter is recycled. 2. The student will describe how the fossil record documents the appearance and diversification of many life forms.
	5	IV. LIFE SCIENCE	F. Flow of Matter and Energy	The student will know that matter and energy flow into, out of, and within a biological system.	
	7	IV. LIFE SCIENCE	E. Biological Populations Change Over Time	The student will understand how biological evolution provides a scientific explanation for the fossil record of ancient life forms, as well as for the similarities observed among the diverse species of living organisms.	
Aquatic Bugs & Their Feeding Habits	3	SCIENCE IV. LIFE SCIENCE	B. Diversity of Organisms	The student will recognize that plants and animals have different structures that serve various functions.	1. The student will describe the structures that serve different functions in growth, survival and reproduction for plants and animals. 1. The student will classify plants and animals according to their physical characteristics. 2. The student will learn that the characteristics used for grouping depend on the purpose of the grouping.
	4	IV. LIFE SCIENCE	B. Diversity of Organisms	The student will know that living things can be sorted into groups in many ways according to their varied characteristics, structures, and behaviors.	
Macroinvertebrate Mayhem	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	1. The student will explore the uses and effects of science in our interactions with the natural world. 1. The student will identify and investigate environmental issues and potential solutions. 1. The student will classify plants and animals according to their physical characteristics. 2. The student will learn that the characteristics used for grouping depend on the purpose of the grouping. 1. The student will recognize that individuals of the same species differ in their characteristics and that sometimes the differences give individuals an advantage in surviving and reproducing.
	4	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will investigate the impact humans have on the environment.	
	4	IV. LIFE SCIENCE	B. Diversity of Organisms	The student will know that living things can be sorted into groups in many ways according to their varied characteristics, structures, and behaviors.	
	5	IV. LIFE SCIENCE	E. Biological Populations Change Over Time	The student will know that biological populations change over time.	
Birds, Beaks, and Adaptations	3	SCIENCE IV. LIFE SCIENCE	B. Diversity of Organisms	The student will recognize that plants and animals have different structures that serve various functions.	1. The student will describe the structures that serve different functions in growth, survival and reproduction... 1. The student will classify plants and animals according to their physical characteristics.
	4	IV. LIFE SCIENCE	B. Diversity of Organisms	The student will know that living things can be sorted into groups in many ways according to their varied characteristics, structures and behaviors.	

River Ecosystem: Web of Life Game	4	SCIENCE IV. LIFE SCIENCE	B. Diversity of Organisms	The student will know that living things can be sorted into groups in many ways according to their varied characteristics, structures and behaviors.	1. The student will classify plants and animals according to their physical characteristics.
	5	IV. LIFE SCIENCE	F. Flow of Matter and Energy	The student will know that matter and energy flow into, out of, and within a biological system.	3. The student will recognize that organisms are growing, dying and decaying, and that their matter is recycled.
	7	IV. LIFE SCIENCE	C. Interdependence of Life	The student will understand that within ecosystems, complex interactions exist between organisms and the physical environment.	1. The student will provide examples of the potentially irreversible effects of human activity on ecosystems. 2. The student will define a population as all individuals of a species that exist together at a given place and time. 3. The student will define an ecosystem as all the populations living together and the physical factors with which they interact. 4. The student will explain the factors that affect the number and types of organisms an ecosystem can support, including available resources, abiotic and biotic factors and disease.
Build an Aluminum Foil Boat	5	SCIENCE I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will understand the process of scientific investigations.	1. The student will perform a controlled experiment using a specific step-by-step procedure and present conclusions supported by evidence.
	6	II. PHYSICAL SCIENCE	A. Structure of Matter E. Forces of Nature	The student will understand that matter is made of small particles and this explains the properties of matter. The student will understand that a variety of forces govern the structure and motion of objects.	5. The student will distinguish between volume, mass and density.
The Island Watershed Activity	4-8	SOCIAL STUDIES V. GEOGRAPHY	B. Maps and Globes	The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.	1. Students will create a variety of maps to scale.
	4	SCIENCE III. EARTH AND SPACE SCIENCE	C. Physical Features and Processes A. Earth Structure and Processes B. The Water Cycle, Weather and Climate	The student will use basic terminology describing basic physical and cultural features of continents. The student will investigate the impact humans have on the environment. The student will recognize that water on Earth cycles and exists in many forms.	1. Students will locate and describe major physical features and analyze how they influenced cultures and civilizations. 1. The student will identify and investigate environmental issues and potential solutions. 1. The student will describe the water cycle involving the processes of evaporation, condensation, precipitation and collection.

Non-point Source Pollution	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	3. The student will recognize the impact of scientific and technological activities on the natural world.
	4	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will investigate the impact humans have on the environment.	1. The student will identify and investigate environmental issues and potential solutions.
The Enviroscope	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	3. The student will recognize the impact of scientific and technological activities on the natural world.
	4	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will investigate the impact humans have on the environment.	1. The student will identify and investigate environmental issues and potential solutions.
	5	I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will understand the process of scientific investigations.	1. The student will perform a controlled experiment using a specific step-by-step procedure and present conclusions supported by the evidence.
My Street is a River	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	3. The student will recognize the impact of scientific and technological activities on the natural world.
	4	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will investigate the impact humans have on the environment.	1. The student will identify and investigate environmental issues and potential solutions.
	5	I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will understand the process of scientific investigations.	1. The student will perform a controlled experiment using a specific step-by-step procedure and present conclusions supported by the evidence.
Map the Mississippi Watershed	4-8	SOCIAL STUDIES V. GEOGRAPHY	A. Concepts of Location	The student will identify and locate major physical and cultural features that played an important role in the history of the United States.	1. Students will locate and name all 50 states, mountain ranges, major river valleys, state capitols and cites.
			B. Maps and Globes	The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.	1. Students will create a variety of maps to scale.
			C. Physical Features and Processes	The student will use basic terminology describing basic physical and cultural features of continents.	1. Students will locate and describe major physical features and analyze how they influenced cultures and civilizations.
			E. Essential Skills	The student will use maps, globes, geographic systems and other sources of information to analyze the nature of places at a variety of scales.	1. Students will demonstrate the ability to obtain geographic information from a variety of print and electronic sources.

Map the River in the Twin Cities	4-8	SOCIAL STUDIES V. GEOGRAPHY	A. Concepts of Location	The student will identify and locate major physical and cultural features that played an important role in the history of Minnesota.	1. Students will locate major Minnesota ecosystems, topographic features, continental divides, river valleys, and cities.
			B. Maps and Globes	The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.	1. Students will create a variety of maps to scale.
			C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	3. Students will identify physical features that either hindered or promoted the development of the fur trade and the rapid settlement in the early 19 th century.
			D. Interconnections	The student will give examples that demonstrate how people are connected to each other and the environment.	2. Students will analyze how the physical environment influences human activities.
Lessons from a Landscape	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	3. The student will recognize the impact of scientific and technological activities on the natural world.
	4	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will investigate the impact humans have on the environment.	1. The student will identify and investigate environmental issues and potential solutions.
	5	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will explore the structures and functions of Earth systems.	3. The student will describe how waves, wind, water and ice shape and reshape the Earth's surface.
	6	I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will understand that scientific inquiry is used in systematic ways to investigate the natural world.	1. The student will identify questions that can be answered through scientific investigations and those that cannot. 2. The student will distinguish among observation, prediction and inference.
	4-8	SOCIAL STUDIES GEOGRAPHY	B. Maps and Globes	The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.	1. Students will create a variety of maps to scale.
A Week at Fort Snelling	4-8	HISTORY I. U.S. HISTORY	E. Growth and Westward Expansion, 1801-1861	The student will demonstrate knowledge of western expansion, conflict, and reform in America.	1. Students will examine the processes that led to the territorial expansion of the United States, including wars and treaties with foreign nations and Indian nations,...Louisiana Purchase... 2. Students will analyze the impact of inventions and technologies on life in America, including... the steamboat,...
	4-8	II. MINNESOTA HISTORY	C. Early Settlement and Statehood, 1810-1860	The student will know and understand the factors that led to rapid settlement of Minnesota in the 19 th century and the changes the new Minnesotans brought with them.	1. Students will explain why early settlers came to Minnesota and analyze their impact on political, cultural, and physical landscapes.

Surf the Mississippi	4-8	SOCIAL STUDIES I. U.S. HISTORY	E. Growth & Westward Expansion, 1801-61	The student will demonstrate knowledge of western expansion, conflict, and reform in America.	2. Students will analyze the impact of inventions and technologies on life in America, including... the steamboat,...
	4-8	V. GEOGRAPHY	A. Concepts of Location	The student will identify and locate major physical and cultural features that played an important role in the history of the United States.	1. Students will locate and name all 50 states, mountain ranges, major river valleys, state capitols and cites.
			C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	3. Students will identify physical features that either hindered or promoted the development of the fur trade and the rapid settlement in the early 19 th century.
			D. Interconnections	The student will give examples that demonstrate how people are connected to each other and the environment.	1. Students will identify factors that drew people to their local communities. 2. Students will analyze how the physical environment influences human activities.
The River Is a Poem	5	LANGUAGE ARTS II. WRITING	A. Types of Writing	The student will compose various pieces of writing.	1. The student will write in a variety of modes to express meaning, including: ...e. poetry.
Big River Art Contest	4-5	ARTS ARTISTIC EXPRESSION	D. Visual Arts	The student will understand and use artistic processes to create, perform, and interpret art works...	1. The student will understand the following components of visual arts: a) elements, including color, line, shape, form, texture, and space; b) principles such as repetition, contrast, or balance. 2. The student will create original works of art to express specific artistic ideas.
	6-8	ARTISTIC CREATIVITY	D. Visual Arts	The student will understand and use artistic processes to create and perform...	1. The student will understand the following components of visual art: a) elements, including color, line, shape, form, texture, and space; b) principles such as repetition, contrast, or balance; d) styles, such as abstract or expressionist. 4. The student will use artistic processes to create in a variety of visual arts contexts. 5. The student will express and communicate ideas using components of visual arts. 7. The student will make and explain artistic choices in creating visual art.
Service Learning: Storm Drain Stenciling	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	1. The student will explore the uses and effects of science in our interaction with the natural world. 2. The student will discuss the responsible use of science. 3. The student will recognize the impact of scientific and technological activities on the natural world.
	4	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will investigate the impact humans have on the environment.	1. The student will identify and investigate environmental issues and potential solutions.

Waters to the Sea (CD-ROM)	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	3. The student will recognize the impact of scientific and technological activities on the natural world.
	4	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will investigate the impact humans have on the environment.	1. The student will identify and investigate environmental issues and potential solutions.
	5	I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will understand the process of scientific investigations.	1. The student will perform a controlled experiment using a specific step-by-step procedure and present conclusions supported by the evidence.
	4-8	SOCIAL STUDIES II. MINNESOTA HISTORY	C. Early Settlement and Statehood, 1810-1860 E. Industrial Era, 1865-1914	The student will know and understand the factors that led to rapid settlement of Minnesota in the 19 th century and the changes the new Minnesotans brought with them. The student will know and understand Minnesota's major industries and the economic, social, political, and technological changes that accompanied industrialization.	1. Students will explain why early settlers came to Minnesota and analyze their impact on political, cultural, and physical landscapes. 2. Students will describe the impact of industrialization on work, home, leisure life, politics, immigration, urbanization, and changes in the physical landscape.
	4-8	V. GEOGRAPHY	A. Concepts of Location	The student will identify and locate major physical and cultural features that played an important role in the history of Minnesota.	1. Students will locate major Minnesota ecosystems, topographic features, continental divides, river valleys, and cities.
			C. Physical Features and Processes D. Interconnections	The student will identify and locate geographic features associated with the development of Minnesota. The student will give examples that demonstrate how people are connected to each other and the environment.	1. Students will identify and compare and contrast the landforms, natural vegetation, climate, and systems of rivers and lakes of Minnesota with those of other parts of the United States. 2. Students will analyze how the physical environment influences human activities.

Big River Journey Learning Stations (field trip activities)	Grade Level	Strand	Sub-Strand	Standard	Benchmarks (ex.)
1: Aquatic Invertebrates	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	3. The student will recognize the impact of scientific and technological activities on the natural world.
	4	IV. LIFE SCIENCE	B. Diversity of Organisms	The student will know that living things can be sorted into groups in many ways according to their varied characteristics, structures, and behaviors.	1. The student will classify plants and animals according to their physical characteristics. 2. The student will learn that the characteristics used for grouping depend on the purpose of the grouping.
2: Mystery of the Disappearing Waterfall	5	SCIENCE III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will explore the structures and functions of Earth systems.	1. The student will recognize the natural processes that cause rocks to break down into smaller pieces and eventually into soil. 3. The student will describe how... water and ice shape and reshape the Earth's surface.
	4-8	SOCIAL STUDIES V. GEOGRAPHY	C. Physical Features and Processes D. Interconnections	The student will use basic terminology describing basic physical and and cultural features of continents. The student will give examples that demonstrate how people are connected to each other and the environment.	1. Students will locate and describe major physical features and analyze how they influenced cultures/civilizations studied. 1. Students will identify factors that drew people to their local communities. 2. Students will analyze how the physical environment influences human activities.
3: Adopt-A-River Crime Lab	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will participate in a controlled scientific investigation.	2. The student will collect, organize, analyze and present data... 3. The student will recognize that evidence and logic are necessary to support scientific understandings.
	4	III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will investigate the impact humans have on the environment.	1. The student will identify and investigate environmental issues and potential solutions.
4: River Birds	3	SCIENCE IV. LIFE SCIENCE	B. Diversity of Organisms	The student will recognize that plants and animals have different structures that serve various functions.	1. The student will describe the structures that serve different functions in growth, survival and reproduction...
	4	IV. LIFE SCIENCE	B. Diversity of Organisms	The student will know that living things can be sorted into groups in many ways according to their varied characteristics, structures and behaviors.	1. The student will classify plants and animals according to their physical characteristics.

5: River Ecosystem	3	SCIENCE IV. LIFE SCIENCE	C. Interdependence of Life	The student will understand that an organism's patterns of behavior are related to the nature of its environment.	1. The student will know that organisms interact with one another in various ways besides providing food.
	4	IV. LIFE SCIENCE	B. Diversity of Organisms	The student will know that living things can be sorted into groups in many ways according to their varied characteristics, structures and behaviors.	1. The student will classify plants and animals according to their physical characteristics.
	5	IV. LIFE SCIENCE	F. Flow of Matter and Energy	The student will know that matter and energy flow into, out of, and within a biological system.	3. The student will recognize that organisms are growing, dying and decaying, and that their matter is recycled.
	7	IV. LIFE SCIENCE	C. Interdependence of Life	The student will understand that within ecosystems, complex interactions exist between organisms and the physical environment.	3. The student will define an ecosystem as all the populations living together and the physical factors with which they interact.
6: Riverboat Piloting	5	SCIENCE I. HISTORY AND NATURE OF SCIENCE	C. Scientific Enterprise	The student will recognize that science and technology involve different kinds of work and engage men and women of all backgrounds.	1. The student will describe different kinds of work done in science and technology.
	5	II. PHYSICAL SCIENCE	D. Motion	The student will understand that changes in speed or direction of motion are caused by forces.	2. The student will demonstrate that the greater the force applied, the greater the change in motion.
	6	II. PHYSICAL SCIENCE	D. Motion	The student will describe the motion of objects.	3. The student will recognize that unbalanced forces acting on an object change the object's speed and/or direction.
A: River Artifacts	4	SCIENCE I. HISTORY AND NATURE OF SCIENCE	A. Scientific World View	The student will understand how science is used to investigate interactions between people and the natural world.	2. The student will discuss the responsible use of science. 3. The student will recognize the impact of scientific and technological activities on the natural world.
	4-8	SOCIAL STUDIES II. MINNESOTA HISTORY	A. Pre-contact to 1650 B. Contact and Fur Trade 1600-1810	The student will demonstrate knowledge of Minnesota's indigenous peoples. The student will demonstrate knowledge of early explorers and fur traders in Minnesota and the impact of the fur trade on both European and Native societies.	1. Students will describe the evidence of the indigenous cultures in Minnesota, and make reasoned inferences from that evidence. 1. Students will describe how early explorers and fur traders affected the development of Minnesota.
	4-8	V. GEOGRAPHY	D. Interconnections	The student will describe how humans influence the environment and in turn are influenced by it.	1. Students will recognize changes over time in nearby landscapes, resulting from human occupation.
B: Soldier Hike	4-8	SOCIAL STUDIES I. U.S. HISTORY	E. Growth and Westward Expansion, 1808-1861	The student will demonstrate knowledge of western expansion, conflict, and reform in American.	1. Students will examine the processes that led to the territorial expansion of the United States including wars and treaties with... Indian nations,... Louisiana Purchase and other land purchases, and the removal of American Indians to reservation.
	4-8	II. MINNESOTA HISTORY	C. Early Settlement and Statehood, 1810-60	The student will know and understand the factors that led to rapid settlement of Minnesota in the 19 th century and the	1. Students will explain why early settlers came to Minnesota and analyze their impact on political, cultural, and physical landscapes.

B: Soldier Hike (cont'd)	4-8	V. GEOGRAPHY	C. Physical Features and Processes	changes the new Minnesotans brought with them. The student will identify and locate geographic features associated with the development of Minnesota.	3. Students will understand why and how the Minnesota Indian Nations negotiated treaties with the United States, and the impact of these treaties for the Ojibwe, the Dakota, and the settlers. 3. Students will identify physical features that either hindered or promoted the development of the fur trade and the rapid settlement in the early 19 th Century.
C: Dakota Life & Culture	4-8	SOCIAL STUDIES I. U.S. HISTORY	A. Pre-history through 1607	The student will understand that large and diverse American Indian Nations were the original inhabitants of North America.	1. Students will compare ways of life of Indian Nations from different regions of North America.
	4-8	II. MINNESOTA HISTORY	B. Pre-history through 1607 A. Pre-contact to 1650	The student will demonstrate knowledge of European exploration of the North American continent and the resulting interaction with American Indian Nations. The student will demonstrate knowledge of Minnesota's indigenous peoples.	2. Students will know and explain that interactions between American Indian tribes and European explorers had positive and negative impacts. 1. Students will describe the evidence of the indigenous cultures in Minnesota, and make reasoned inferences from that evidence. 2. Students will explain the major historical aspects of Dakota and Ojibwe culture, social organization and history, and compare and contrast them.
	4-8	V. GEOGRAPHY	C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	2. Students will identify physical features that shaped settlement and life-ways of the Dakota and the Ojibwe and analyze their impact.
D: Floodplain Hike	5	SCIENCE III. EARTH AND SPACE SCIENCE	A. Earth Structure and Processes	The student will explore the structures and functions of Earth systems.	3. The student will describe how waves, wind, water and ice shape and reshape the Earth's surface. 4. The student will describe the impact of floods... on the Earth.
	5	IV. LIFE SCIENCE	F. Flow of Matter and Energy	The student will know that matter and energy flow into, out of, and within a biological system.	3. The student will recognize that organisms are growing, dying and decaying, and that their matter is recycled.
	4-8	SOCIAL STUDIES V. GEOGRAPHY	C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	1. Students will identify and compare and contrast the landforms, natural vegetation, climate, and systems of rivers and lakes of Minnesota with those of other parts of the United States.